



1. General information

Course: WEB AND SERVICES ENGINEERING**Type:** ELECTIVE**Degree:** 406 - UNDERGRADUATE DEGREE IN COMPUTER SCIENCE AND ENGINEERING (AB)**Center:** 604 - SCHOOL OF COMPUTER SCIENCE AND ENGINEERING (AB)**Year:** 4**Main language:** English**Use of additional languages:****Web site:****Code:** 42367**ECTS credits:** 6**Academic year:** 2023-24**Group(s):** 17**Duration:** First semester**Second language:****English Friendly:** Y**Bilingual:** N**Lecturer:** GABRIEL CEBRIÁN MÁRQUEZ - Group(s): 17

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2. Pre-Requisites

The *Web Engineering and Services* course requires knowledge related to the Rational Unified Process (RUP) and the Unified Modeling Language (UML). This knowledge can be acquired during the *Software Engineering I* course that is part of the Module I of the Computing Science degree curricula.

Although not required, any knowledge acquired during the *Software Design* and the *Software Engineering Processes* courses that are part of the *Software Engineering* specialization will be very welcome. Additionally, although not strictly necessary, students should have some prior knowledge of the HTML, CSS and JavaScript languages. These skills can be acquired during the *Web System Technologies* course that is part of the *Information Technology* specialization.

3. Justification in the curriculum, relation to other subjects and to the profession

The Web is one of the most popular communication and content distribution platform in the world, enabling users and applications the exchange of information through the Internet. Web systems can be defined as a set of distributed web applications supported by a client-server architecture, developed with standard Web languages and technologies such as HTML, XML, CSS, JavaScript, etc.

Modern web systems cover both Business-to-Client (B2C) as well as Business-to-Business (B2B) applications. While most B2C applications are usually implemented as graphical user interfaces rendered in web browsers using languages such as HTML, CSS and JavaScript, B2B applications are usually implemented as web Application Programming Interfaces (APIs) acting as Web services using languages and formats such as XML and JSON. Let's take as an example the case of a web system that provides support to an online shop. While the web application that allows clients to buy products is an example of a B2C web application, the web application that automatically requests products from the shopping provider when the product stock is under a threshold value is an example of a B2B web application.

From the B2C applications' perspective, web services enable applications to move the web page rendering from the server side to the client side of the application, improving the web application performance and flexibility. From the B2B applications' perspective, web services enable users to share software applications and even platforms and infrastructures.

As we have mentioned, web services serve as a communication platform requiring protocols to exchange information. In order to work properly and improve software reuse and maintenance, these protocols follow standards that are the basis of Service Oriented Architectures (SOAs) and cloud computing.

Due to the evolution of web technologies and services during the last decade, the discipline of Web Engineering has adapted and optimized development processes and methodologies to cope with the particularities of web applications. This course focuses on the development of web systems using web technologies and services following well-established Web Engineering processes and methodologies.

4. Degree competences achieved in this course

Course competences

Code	Description
INS01	Analysis, synthesis, and assessment skills.
IS03	Ability to solve problems of integration according to strategy functions, standards, and available technologies.
SI01	Ability to integrate information and communication technology solutions and entrepreneurial process so as to fulfil the needs for information in organisation, allowing them to meet their goals in an effective and efficient manner, providing them with competitive benefits.
SI02	Ability to determine the needs of information and communication systems in an organisation, following security aspects and complying with current laws and regulations.
UCLM01	Command of a second language at a B1 level within the Common European Framework of Reference for Languages

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Knowledge of the legal environment of the auditing of information systems, as well as the main areas of information systems auditing, and have skills in the use of tools for auditing.

Improvement of communication skills of the student in English language

6. Units / Contents**Unit 1: Web Engineering****Unit 1.1** Web application development process and modeling techniques**Unit 1.2** Web project management and scheduling**Unit 1.3** Web application quality management and auditing**Unit 1.4** Content management systems. Web application domains**Unit 2: Web development****Unit 2.1** Server-side frameworks and applications**Unit 2.2** Client-side frameworks and applications**Unit 3: Web service Engineering****Unit 3.1** The service-oriented paradigm**Unit 3.2** Service-oriented organizations**Unit 3.3** Service-oriented architectures**Unit 3.4** Advanced aspects on services**Unit 4: Web service development****Unit 4.1** Web service languages and protocols**Unit 4.2** Web service tools and technologies**7. Activities, Units/Modules and Methodology**

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	INS01 SI01 UCLM01	0.9	22.5	N	-	[MAG] Theory lectures
Problem solving and/or case studies [ON-SITE]	Workshops and Seminars	INS01 SI01 UCLM01	0.6	15	N	-	[PRO] Guided theoretical-practical seminars
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	IS03 SI02 UCLM01	0.72	18	N	-	[LAB] Laboratory sessions
Formative Assessment [ON-SITE]	Assessment tests	INS01 IS03 SI01 SI02 UCLM01	0.06	1.5	Y	Y	[EVA] Assessment of the practical project deliverables and interviews
Formative Assessment [ON-SITE]	Individual presentation of projects and reports	INS01 SI01 UCLM01	0.12	3	Y	N	[EVA] Presentation of the research project
Writing of reports or projects [OFF-SITE]	Reading and Analysis of Reviews and Articles	IS03 SI02 UCLM01	0.9	22.5	Y	N	[RES] Writing of the report of the research project
Study and Exam Preparation [OFF-SITE]	Self-study	INS01 SI01 UCLM01	1.46	36.5	N	-	[EST] Study and preparation of theory tests
Practicum and practical activities report writing or preparation [OFF-SITE]	Practical or hands-on activities	IS03 SI02 UCLM01	1.2	30	Y	Y	[LAB] Practical project deliverables
On-line Activities [OFF-SITE]	Assessment tests	INS01 IS03 SI01 SI02 UCLM01	0.04	1	Y	Y	[EVA] Online questionnaires regarding theoretical concepts of the course
Total:			6	150			
Total credits of in-class work: 2.4			Total class time hours: 60				
Total credits of out of class work: 3.6			Total hours of out of class work: 90				

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Laboratory sessions	45.00%	45.00%	[LAB] Practical project deliverables and associated interviews.
Theoretical papers assessment	15.00%	15.00%	[INF] Research project's report.
Oral presentations assessment	10.00%	10.00%	[PRES] Research project's oral presentation.
Progress Tests	30.00%	30.00%	[ESC] Multiple-choice tests regarding theoretical concepts of the course.
Total:	100.00%	100.00%	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:**Continuous assessment:**

The assessment is divided into 4 parts, namely [ESC], [LAB], [INF] and [PRES], with their respective weights, as shown in the table above:

- [ESC]: The student must complete a multiple-choice questionnaire after each lecture. The mark of this item is calculated as the arithmetic mean of all the marks obtained in these questionnaires. Non-answered questionnaires are awarded with 0 points. The minimum mark for this item is 3.5 points out of 10. In the case that the student does not obtain a mark greater than or equal to the minimum mark, the student will be able to take a theoretical exam at the end of the semester. The minimum mark for this exam is 3.5 points out of 10.

- [LAB]: The practical project of the course is divided into 4 deliverables with different weights. The mark of this item is calculated as the weighted mean of the marks obtained in the deliverables. The minimum mark for this item is 4 points out of 10.
- [INF] and [PRES]: The student must submit a report of the research project of the course ([INF]) and must present it in class ([PRES]). The oral presentation will be evaluated by the rest of students and the professor.

The [ESC] and [LAB] items are mandatory and have the minimum marks specified above. If the mark obtained in any of these two parts is not greater than or equal to the corresponding minimum mark, the maximum mark of the ordinary call will be no greater than 4.5 points out of 10.

By default, the student will be assessed under the continuous assessment criteria. Should the student want to switch to the non-continuous assessment criteria, the student must fill the form in <https://www.esiiaab.uclm.es/alumnos/evaluacion.php> before the end of the teaching period as long as no more than 50% of the assessable items have been taken.

Non-continuous evaluation:

The assessment is divided into the same parts and weights as in the continuous assessment criteria. Nonetheless, the evaluation changes in the following aspects.

- [ESC]: The student must take a theoretical exam comprising all the contents of the course. The minimum mark for this item is 3.5 points out of 10.
- [LAB]: The student must submit the practical project of the course in its entirety along with a comprehensive report. The student must also take a face-to-face interview about the project. The minimum mark for this item is 4 points out of 10.
- [INF] and [PRES]: The student must submit a report of the research project of the course ([INF]) and must present it before the professor ([PRES]).

The [ESC] and [LAB] items are mandatory and have the minimum marks specified above. If the mark obtained in any of these two parts is not greater than or equal to the corresponding minimum mark, the maximum mark of the ordinary call will be no greater than 4.5 points out of 10.

Specifications for the resit/retake exam:

The evaluation criteria are the same as in the non-continuous assessment method of the ordinary call.

Specifications for the second resit / retake exam:

The evaluation criteria are the same as in the non-continuous assessment method of the ordinary call and the extraordinary call.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
General comments about the planning: The subject is taught in three weekly sessions of one and a half hours. This planning is ORIENTATIVE, and may vary throughout the course depending on the teaching needs, holidays and any other unforeseen cause. The weekly planning of the subject can be found in detail and updated in Campus Virtual.	
Unit 1 (de 4): Web Engineering	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	18
Writing of reports or projects [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	7.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	15
On-line Activities [AUTÓNOMA][Assessment tests]	.5
Unit 2 (de 4): Web development	
Activities	Hours
Problem solving and/or case studies [PRESENCIAL][Workshops and Seminars]	10.5
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	13.5
Formative Assessment [PRESENCIAL][Assessment tests]	1
Writing of reports or projects [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	3
Study and Exam Preparation [AUTÓNOMA][Self-study]	12
Practicum and practical activities report writing or preparation [AUTÓNOMA][Practical or hands-on activities]	15
Unit 3 (de 4): Web service Engineering	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4.5
Writing of reports or projects [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	7.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	4.5
On-line Activities [AUTÓNOMA][Assessment tests]	.5
Unit 4 (de 4): Web service development	
Activities	Hours
Problem solving and/or case studies [PRESENCIAL][Workshops and Seminars]	4.5
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	4.5
Formative Assessment [PRESENCIAL][Assessment tests]	.5
Formative Assessment [PRESENCIAL][Individual presentation of projects and reports]	3
Writing of reports or projects [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	4.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	5
Practicum and practical activities report writing or preparation [AUTÓNOMA][Practical or hands-on activities]	15
Global activity	
Activities	hours
Formative Assessment [PRESENCIAL][Individual presentation of projects and reports]	3
Writing of reports or projects [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	22.5
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	18
Problem solving and/or case studies [PRESENCIAL][Workshops and Seminars]	15
Practicum and practical activities report writing or preparation [AUTÓNOMA][Practical or hands-on activities]	30
Study and Exam Preparation [AUTÓNOMA][Self-study]	36.5
Class Attendance (theory) [PRESENCIAL][Lectures]	22.5
Formative Assessment [PRESENCIAL][Assessment tests]	1.5
On-line Activities [AUTÓNOMA][Assessment tests]	1

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Roger Pressman, Bruce Maxim	Web Engineering: A Practitioner's Approach (8th edition)	McGraw-Hill		978-0078022128	2014	
Leonard Richardson, Sam Ruby	RESTful Web Services	O'Reily		978-0596529260	2007	
Gerti Kappel, Birgit Proll, Siegfried Reich, Werner Retschitzegger	Web Engineering: The Discipline of Systematic Development of Web Applications	Wiley		978-0470015544	2006	